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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/627,098

07/25/2003

Noriaki Kaneda

1-2-2

3673

7590

09/20/2006

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EXAMINER

JEAN BART, RALPH

ART UNIT

PAPER NUMBER

2613

DATE MAILED: 09/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/627,098

Applicant(s)

KANEDA ET AL.

Examiner

Ralph Jean-Bart

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2631

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09/08/2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5,7-9,11-16,18,20-22 is/are rejected.
- 7) ☒ Claim(s) 6,10,17,19 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|----------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>07/25/2003</u> . | 6) <input type="checkbox"/> Other: _____ |

Objection

The numbering of claims is not in accordance with 37 CFR 1.126 which requires the original numbering of the claims to be preserved throughout the prosecution. When claims are canceled, the remaining claims must not be renumbered. When new claims are presented, they must be numbered consecutively beginning with the number next following the highest numbered claims previously presented (whether entered or not).

Misnumbered claims 2-23 has been renumbered 1-22.

Allowable Subject Matter

Claim 6, 10, 17, and 19 are objected to as being dependent upon a rejected base claim, the prior art teaches a feed forward equalizer, a decision feedback equalizer, but fails to teach said coefficients $c(k+1)$ at a time $(k+1)$ as $c(k) + \beta N[e(k)]^{2N-1} u(k)$ and $w(k+1)$ at a time $(k+1)$ as $w(k) + \beta N[e(k)]^{2N-1} r(k)$, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 11, 12, 13, 20, 21, and 22 are rejected under 35 U.S.C. 102(e) as being anticipated by Phanse et al (U.S. Pub 2003/0189998).

With respect to claim 11 and 20, Phanse teaches a photo-detector for converting said optical signal to an electrical signal (see paragraph 0156); an equalizer for removing intersymbol interference from said electrical signal (see paragraph 0022); and a slicer to produce a predicted signal in response to each input signal based upon a slicing threshold (see figure 5b signal slicer 116b), said slicing threshold is varied based upon a signal distribution of said electrical signal (see paragraph 0157).

With respect to claim 12 and 21, Phanse teaches a threshold control algorithm to track said signal distribution of said electrical signal and adjust said slicing threshold for a reduced bit error rate of said predicted signal (see figure 6B Threshold values 212; paragraph 0243).

With respect to claim 13 and 22, Phanse teaches said threshold control algorithm accumulates said signal distribution information within a window of finite

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duration to allow tracking of slowly varying non-stationary channels (see paragraph 0246).

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-5,9,14,15,16 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Choa (U.S. 6,718,087) in View of Eugene Walach.

With respect to claim 1, 2, and 14 Choa teaches a photo-detector for converting said optical signal to an electrical signal (see figure 6,m photo detector 500; paragraph 0061) and an equalizer for removing inter-symbol interference from said electrical signal (see figure 3,adaptive equalizer 150; figure 4 weight adjustment 240; paragraph 0045) said equalizer having a plurality of coefficients configured to be updated (see figure 4 elements 220 and 250). With respect to claim 2, Chao teaches a controller to update said coefficient (see figure 4 Weight updater 240; paragraph 0049). Choa fails to teach a least-mean 4Nth-order (LMN) algorithm, where N is greater than one.

However, Walach teaches a least-mean 2Nth-order (LMN) algorithm, where K is greater than one (it should be noted, when k is greater than 1 is a least mean Nth order algorithm, see page 275 paragraph 4).

Therefore, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains to have

modified the Differential Mode dispersion of Choa in order for the “performance of the new algorithms was analyzed and it was shown that in certain cases the choice of $K > 1$ will outperform the conventional LMS algorithm by a considerable margin” as taught by Walach (see Walach page 281 paragraph 3).

With respect to claim 3 and 15 Choa teaches said equalizer is a finite impulse response filter configured to produce a first output signal responsive to said electrical signal (see figure 4 element 150, output signal 190; paragraph 0043), said first output signal being representative of a sum of the associated electrical signal plus a weighted sum of previous ones of the electrical signal (see figure 4 element 130), wherein the previous signals are weighted by said coefficients (see figure 4 element 180).

With respect to claim 9 and 18, all the limitations have been discussed in claims 1, 3, and 14 above. In addition, Choa teaches a second subtractor to produce an error signal representing a difference between the second output signal and a corresponding training signal or predicted signal (see figure 4 second adder 230, second output signal 210 and the predicted output signal $d(k)$), a feedback filter to produce the feedback signal in response to corresponding ones of the predicted or training signals (see figure 4 filter 150 and output signal 250), the feedback signal being a weighted sum of the predicted or training signal (see figure 4 element 230, 240 and 150), wherein weights in the sum being characteristics of the filter (see figure 4 element weight updater 240 and adder 230).

With respect to claim 4 and 16 all the limitations of claim 4 have been discussed in claims 2 and 14 above. Choa teaches a slicer to produce a predicted signal for each

first output signal received from the finite impulse response filter (see figure 4 decision element 140, output signal 210 and 220; paragraph 0024); a subtractor to produce an error signal proportional to the difference between said first output signal and a corresponding predicted signal or training signal (see figure 4 adder 130); and a controller configured to update said coefficients responsive to the error signal (see figure 4 weight updater 240).

With respect to claim 5, Choa teaches said slicer is configured to produce the predicted signal by adaptively determining a slicing threshold (see paragraph 0024).

Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Choa (U.S. 6,718,087) and Eugene Walach as applied to claims 1 and 2 above, and further in view of Kaleh (U.S. 5,048,058).

With respect to claim 7 and 8 Choa and Walach teach all the limitations of claim 1 and 2 above. They fail to teach the equalizer is a digital with respect to claim 8 and an analog with respect to claim 8.

However, Kaleh teaches a digital (see column 7 lines 24-26) and an analog filter (see column 7 lines 16-26).

Therefore, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains to have modified the Differential Mode dispersion of Choa and the least means fourth order algorithm of Walach by incorporating a digital filter in order to increase the performance of the transmitter and the receiver and further, by using an analog filter in eliminating the

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inter-symbol interference at the sampling instants KT as taught by Kaleh (see Kaleh column 1 lines 32-35 and column 7 lines 33-36).

Conclusion

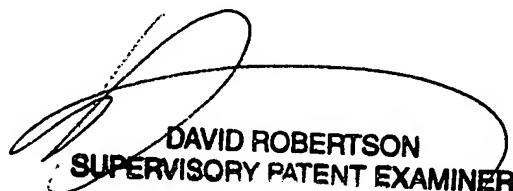
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ralph Jean-Bart whose telephone number is (571) 270-1017. The examiner can normally be reached on Monday to Thursday from 8 to 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Robertson, can be reached on 571-272-4186. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Ralph Jean-Bart

09/11/2006


DAVID ROBERTSON
SUPERVISORY PATENT EXAMINER